

**REMARKS**

Reconsideration and allowance are requested.

Applicant appreciates the Interview courteously granted by Examiner Lindsey Teaters and Supervisory Patent Examiner Tu Hoang to Applicant's representative Meera Narasimhan on October 19, 2009.

The claim amendments to place all the pending claims in condition for allowance, as discussed during the interview, are being proposed above. Also, the arguments for patentability are being presented below.

**The present claims are patentable under 35 U.S.C. 103(a).**

**BACKGROUND:**

Rice, on which Japanese live, is obtained as follows:

Brown rice is obtained by removing husk from paddy.

Polished rice and bran is obtained when the brown rice is agitated as pressing such that brown rice grains rub each other.

Removed skin from brown rice is obtained as bran, but part of the bran is stuck to polished rice grains and bran layers formed on surfaces of the polished rice grains (hereinafter referred as "skin bran"). The polished rice obtained in the above-mentioned manner is delicate food. Therefore in order to prevent the rice from spoiling its taste, it should be carefully treated taking into the following points into consideration.

- 1) Since 20% of oil is included in the skin bran on surfaces of the polished rice grains and in the bran, the bran easily sticks to the surfaces of the polished rice grain and it is difficult to remove such stuck bran from the surfaces of the grains. Therefore it is necessary to

devise how to remove such bran and skin bran from the polished rice. Since the bran bears smell which spoils taste of cooked rice, usually it is necessary to wash polished rice 4 to 5 times by 5 to 6 times volume of water before cooking in order to remove the bran and skin bran almost completely.

2) When a rather high pressure is added to rice, some of the rice is crushed. When the crushed rice is cooked it is formed into paste, which spoils taste of cooked rice.

3) Once (either brown or polished) rice is exposed to water, it is deteriorated gradually. Such deterioration cannot be recovered, even if once wetted rice is dried. Such dried rice becomes brittle. If the rice is not completely dried, molds and germs breed in the rice, as a result taste of cooked rice is spoiled. Consequently, it is important to polish rice without using water from quality (or taste) point of the rice.

4) When rather strong air flow is blown on to the rice, the rice tends to be dried too much, which leads to crushed rice and causes the same results as described in 2).

5) When rice is exposed to a rather high temperature, rice is deteriorated and taste of the cooked rice is spoiled. Therefore, it is necessary to consider a rather high pressure is not exposed to rice during polishing and finishing steps in order to keep the temperature of polishing or finishing rice at a lower level.

6) Since static electricity is generated during processing steps of rice, and since fine powders are stuck to rice grains by such static electricity, it is necessary to consider effective counter measures against generated static electricity.

In conclusion, it is necessary to treat the rice carefully, without using water, without exposing too much pressure and too strong air follow on the rice before cooking the rice. The present invention was made in order to satisfy these considerations.

Since wash-free rice by the present invention does not require any water during processing steps and also before cooking, the wash-free rice by the present invention prevents water pollution in rivers by rich nourishment in washed water of the rice, so that the wash-free rice by the present invention contributes to society by saving water and time (for washing rice).

**UNIQUE CHARACTERISTIC FEATURES OF THE PRESENT INVENTION:**

The invention includes, but is not limited to, the following features (see also page 21, line 23, to line 19, page 22 of the original specification):

- a) The parched bran is employed as the abrasive so to remove oil contained in the bran, particularly the skin bran sticking to surfaces of polished rice grains without harming the rice.
- b) A complete dry system, where no water is used, is employed in order to prevent rice quality from deteriorating.
- c) Mechanisms or devices (such as brushes), which do not expose a strong pressure on rice grains, are employed so as to avoid rice grains from crushing or hurting.
- d) Mechanisms or devices, which do not expose strong wind flows on rice grains, are employed so as to avoid rice grains from crashing or hurting due to extensive drying of the rice grains.
- e) In order to enhance effective separation of the sticking bran from the rice grains, the ionized air flows upward so as to strike rice grains falling little by little in open space in the sifting machine or in the separating means.

f) In the separating means, the brushes are revolved in a reverse direction to a direction of the rice grains falling along the supply guide means, so that fine bran powders sticking to the rice grains easily float in the air, which enhances removal effects of the bran.

Claims 2 and 3 are patentable under 35 U.S.C. 103(a) over Kondo (JP 10080641 A) in view of Saito (JP 2002113374 A) and Ishizuka (JP2002238479 A).

The present invention defines a unique method and apparatus for producing wash-free rice in a waterless environment that is distinguishable from the art of record.

The inventive features include, but are not limited to:

- 1) since the bran sticking to the rice grains is removed in two steps, namely, in the sifting step and in the separating step, thus bran is almost completely removed from rice grains.
- 2) Since the ionized air is supplied to the above-mentioned two steps in order to prevent the removed bran and fine powders from sticking to the rice grains again, these bran removing steps can be carried out more effectively.
- 3) In the separating step, the ionized air flows upward (in direction D in FIG.5 and in Direction H in FIG.7), while rice grains flows downward little by little in order to eliminate static electricity more effectively from rice grains. Since the ionized air flows counter-currently to the little by little flow of the rice grains, static electricity is effectively eliminated from the rice grains.
- 4) In the separating step, while the rice grains flow downward, the surfaces of the rice grains are brushed in several units.

The Examiner's rejection of the claims relies on Saito as teaching ionized air being supplied to the sifting and separating steps. However, the present invention is quite different from Saito as follows:

1) In the present invention, the bran sticking to the rice grains is removed in two steps, namely, in the sifting step and in the separating step, bran is almost completely removed from rice grains. In the separating step, the ionized air flows upward (in direction D in FIG.5 and in Direction H in FIG.7), while rice grains flows downward little by little in order to eliminate static electricity more effectively from rice grains. Since the ionized air flows counter-currently to the little by little flow of the rice grains, static electricity is effectively eliminated from the rice grains.

On the other hand, Saito teaches the ionized air is supplied to the bottoms of the two brown rice compartments 18a and 18b, in which mixtures of polished rice grains 17a and bran 17b are filled (see FIG.1), while a helical screw feeder 22 is operated for polishing brown rice grains. While the bran 17b flows upward along with ionized air to a bypass pipe 33, separations and sticking of the bran 17b occur repeatedly. Therefore removing efficiency of the bran is not so effective so that it will take a long time to remove the bran completely.

2) Since method by the present invention including the supplying step of the ionized air is carried out continuously, it is easy to operate and control the method stably.

On the other hand, Saito's method is carried out batch by batch in the brown rice compartments 18a and 18b where rice grains are circulated between the two compartments until the rice polishing operation is finished so that ratio between the bran and the rice grains varies as the progression of the rice polishing operation. Therefore it is very difficult to operate and control method stably. After the polishing operation is over, the polished rice grains are discharged from the bottom (see FIG. 2).

All the references mandate a water based treatment process and apparatus which lead away from the present claims.

Claim 4 is patentable under 35 U.S.C. 103(a) over Kondo (JP 10080641 A), Saito (JP 2002113374 A), Ishizuka (JP2002238479 A) and Burkholder (U.S. Patent 5,975,441).

The Examiner rejects claim 4 over Kondo, Saito, Ishizuka and Burkholder (US 5,975,441), which relates to a cylindrical rotary brushing means.

As pointed out above, Kondo, Saito, and Ishizuka do not teach or suggest the claimed invention. Therefore any further combination with other references will also lead away from the present claims.

In any case, the present invention is quite different from Burkholder for at least the following reasons:

1) Objects to be brushed are quite different. The present invention treats mixtures of the rice grains and bran, which have dimensions less than a few millimeters. While treating the mixtures, only faint brushing pressure against the mixture is allowed in order to prevent the rice grains from breaking into tiny pieces. On the other hand, since Burkholder treats rocks, with dimensions far larger than the rice grains, in order to knock the clay, mud and soil off the rocks (col.4, line 54), rather strong pressure against the rocks are required, so that roller assemblies 3, 4 having spike members 5 are employed (col.4, lines 40-41; Fig.1) instead of the claimed brushing means for brushing the surfaces of the rice grains defined by the present invention.

2) Since the present method is applied to food (rice) the brushing system is arranged in a closed system (see, for example, FIGs.5 and 9). On the other hand, Burkholder is applied to the rocks, the brushing system is arranged in an open system.

3) The brushing step by the present invention is carried out in a dry system. On the other hand, since the brushing system by Burkholder is arranged in the open system, a wet system is preferable in order to suppress dust from generating.

4) The ionized air is supplied to the brushing system by the present invention, but it is not necessary to supply ionized air to the brushing system by Burkholder.

Kondo's (JP10-080641) apparatus functions as follows: brown rice and starch powder used as abrasive are supplied from a hopper 5 to a (screw-type) separating casing B where the brown rice and the starch powder are mixed by a screw 2; polished rice is sent to a casing C via outlet path 6 after removing the starch powder and generated bran (see FIG.3); bran coating with or sticking to polished rice grains is removed by air blowing in a screw axis 10a via a nozzle 16 from a fan 15 (sometimes damp air is supplied, see paragraph [0016]). The following points taught by Kondo lead away from the present invention:

- a) When the polished rice is mixed with the starch powder used as the abrasive, it is rather difficult to remove the skin bran or the bran including 20% of oil sticking to rice grains by the starch powder, because the starch powder (produced from crushed rice, see paragraph [0015]) has the same hardness as that of the rice. On the contrary, it is probable that the starch powder may stick to the polished rice grains, so that it is difficult to obtain genuine wash-free rice.
- b) When the damp air blown in the casing C, a portion of water may remain in the polished rice, so that quality and/or taste of the polished rice is easy to be deteriorated by the remaining water or germs generated by the remaining water.
- c) The screw-type casing B employed in the finishing step is not suitable for mixing the rice grains but suitable for transporting.
- d) Static electricity removing means is not employed in Kondo's apparatus. Even if static electricity removing means described in Saito (JP2002-113374) is combined with Kondo, no effects are attained by that means when damp air is blown.

On the other hand, the present invention has the following unique advantages over Kondo:

1. Since the parched bran flows smoothly like dried sand and is harder than the rice grains to some extent, it is suitable used for the abrasive. Since parched bran is dry, it can remove 20% of oil including in the sticking bran by soaking the oil into the parched bran. And its hardness is suitable for polishing the rice grains so that the skin bran is effectively removed from the surfaces of the rice grains.
2. After the polishing step, the ionized air flows upward (in direction D in FIG.5 and in Direction H in FIG.7), while rice grains flows downward little by little in order to eliminate static electricity more effectively from rice grains. Since the ionized air flows counter-currently to the little by little flow of the rice grains, static electricity is effectively eliminated from the rice grains. And since the ionized air is supplied in steps (sifting step and separating step), the bran sticking to the rice grains is removed almost completely, which leads to delicious rice when cooked.
3. Since no water is used by the present invention, finished rice is virtually not deteriorated.

Saito (JP2002-113374) teaches that the ionized air is supplied to the bottoms of the two brown rice compartments 18a and 18b, in which mixtures of polished rice grains 17a and bran 17b are filled (see FIG.1), while a helical screw feeder 22 is operated for polishing brown rice grains. And the bran 17b flows upward along with ionized air and exhausted from a bypass pipe 33.

The following points of Saito lead away from the present invention:

a) Since ionized air is supplied from the bottom, the air must be pressurized in order to cope with filled mixtures of polished rice grains and bran in the compartments, so that the rice grains are exposed on a considerable pressure of the ionized air, which may deteriorate quality of rice as described in 2) of **BACKGROUND** (above).

b) Since separations and re-sticking of the bran 17b occur continuously and repeatedly while flowing upward, removing efficiency of the bran is not so effective so that it is difficult to remove the bran completely. And it will take a long time before the bran is removed completely. Saito's method is carried out batch by batch in the brown rice compartments 18a and 18b where rice grains are circulated between the two compartments until the rice polishing operation is finished so that ratio between the bran and the rice grains varies as the progression of the rice polishing operation. Therefore it is very difficult to operate and control method stably.

c) Since the ionized air supplying means 32 is installed in the rice polishing apparatus 10 (see FIG.1), it is probable that the rice powder and oil containing bran stick to the ionized air supplying means, so that a stable operation of the means might not be attained.

On the other hand, the present invention has the following unique advantages over Saito:

1. The stuck bran is removed at two steps by ionized air, which is generated outside of the processing steps. The ionized air flows upward, while rice grains flows downward little by little so that the bran and abrasive (parched bran) stuck to rice grains by static electricity, can be removed effectively and almost completely.

2. Since the ionized air is supplied from outside to the continuously operated sifting step and separating step, the system by the present invention can be operated on the same conditions, so that the bran and the abrasive is stably removed.

As mentioned above, since there are big differences between Kondo and/or Saito and the present invention, even a person having ordinary skill in the art could not have thought of the present invention by combining Kondo and Saito.

Burkholder (U.S. 5,975,441) relates to an apparatus for separating rocks from soil, in which revolving hard brushes (spike rollers) such as cleaning brushes used for floors, roads and the like are employed in order to remove clay, mud and soil stuck to rocks.

However, there are numerous differences between the Burkholder apparatus and the present invention as follows:

a) If the rice grains are brushed by the spike rollers of Burkholder, rice grains which are far softer than rocks, are easily hurt or crushed when a high pressure is exposed on by the spike rollers. As mentioned in 2) of **BACKGROUND**, the hurt or crushed rice grains spoil the taste of cooked rice. Therefore, in order to remove remaining fine foreign particles (most of them are the parched bran used as abrasive) sticking to the surfaces of the rice grains, it is necessary to employ soft brushes particularly in finishing units.

b) Even if a plurality of spike rollers 5 arranged in line in the spike roller assembly bed B by Burkholder (see FIG.1) are replaced with brushes by the present invention, tiny rice grains are easily penetrate into spaces among the brushes and some of them fall to the ground, so that the rice grains are not effectively transported. Much less, it is not expected to remove foreign particles sticking to the rice grains by utilizing the arrangement of Burkholder.

c) Even if the spike roller assembly bed B by Burkholder is arranged upright as arranged in the present invention, the rice grains do not stay among spikes of the spike roller 5 but immediately fall down without removing foreign particles, because no supply guide means

(which change flow directions of the rice grain and delay flowing speeds of the rice grains) are arranged in the spike roller assembly bed.

d) The spike rollers 5 by Burkholder are continuously arranged as shown in FIG.1, but the respective brush rollers by the present are independently arranged as shown in FIGs.5 and 7. In the present invention, since the rice grains are transported downward from a brush roller to the next via the supply guide means, removed rates of the foreign particles are raised as the rice grains are transported downward, and finally the foreign particles are removed almost completely.

e) Since the spike rollers 5 by Burkholder revolve in the same direction as transporting direction of the object, the transportation is too smooth and too fast to remove the foreign particles effectively. However, the brushes in the separating means by the present invention revolve in a reverse direction to a direction of the rice grains falling along the supply guide means, so that fine bran powders sticking to the rice grains easily floated in the air, which enhances removing effects of the bran.

f) In the finishing step by the present invention, the ionized air flows upward, while rice grains flows downward little by little so that foreign particles (parched bran) stuck to rice grains are removed effectively and prevented from sticking to the rice grains again. On the other hand, Burkholder does not employ such ionized air.

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Claims 7 and 9 are patentable under 35 U.S.C. 103(a) over Kondo (JP 10080641 A), Burkholder (U.S. Patent 5,975,441), Otsuka (JP 2002248359 A) and Saito (JP 2002113374 A).

Kondo, Otsuka and Saito as well as Burkholder, as pointed out earlier, do not describe, teach or suggest the claimed features. Therefore the combination of Kondo and Burkholder, with or without Otsuka and Saito, will lead away from the present invention.

Since the method and apparatus of the present invention has the distinguishable features as pointed out above, even a person having ordinary skill in the art could not arrive at the claimed invention by combining the teachings of the cited references.

Claim 8 is patentable under 35 U.S.C. 103(a) over Kondo (JP 10080641 A), Burkholder (U.S. Patent 5,975,441), Otsuka (JP 2002248359 A), Saito (JP 2002113374 A) and Schreiber (U.S. Publication 2002/0060181).

Kondo, Otsuka, Saito, and Burkholder, as pointed out earlier, do not describe, teach or suggest the claimed features. Therefore any further combination with Schreiber will also lead away from the present invention.

Claim 10 is patentable under 35 U.S.C. 103(a) over Kondo (JP 10080641 A), Burkholder (U.S. Patent 5,975,441), Otsuka (JP 2002248359 A), Saito (JP 2002113374 A) and Richter (U.S. Patent 4,505,777).

Kondo, Otsuka, Saito, and Burkholder, as pointed out earlier, do not describe, teach or suggest the claimed features. Therefore any further combination with Richter will also lead away from the present invention.

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Claim 11 is patentable under 35 U.S.C. 103(a) over Kondo (JP 10080641 A), Burkholder (U.S. Patent 5,975,441), Otsuka (JP 2002248359 A), Saito (JP 2002113374 A) and Carlton (U.S. Patent 4,330,340).

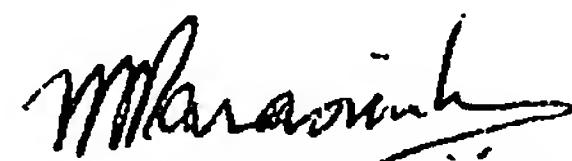
Kondo, Otsuka, Saito, and Burkholder, as pointed out earlier, do not describe, teach or suggest the claimed features. Therefore any further combination with Carlton will also lead away from the present invention.

For these additional reasons, and for the reasons set forth regarding the rejection of Claims 2 and 7, the rejection of all the dependent Claims under 35 U.S.C. 103(a) as being obvious over Kondo in view of Saito, Ishizuka, Burkholder and other references is also improper, and should be withdrawn.

## CONCLUSION

Reconsideration and allowance are respectfully requested.

Respectfully,



James C. Wray, Reg. No. 22,693  
Meera P. Narasimhan, Reg. No. 40,252  
1493 Chain Bridge Road, Suite 300  
McLean, Virginia 22101  
Tel: (703) 442-4800  
Fax: (703) 448-7397

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